

**TRIOZA CHENOPODII REUTER: FIRST NORTH AMERICAN RECORD OF
AN OLD WORLD PSYLLID (HOMOPTERA: PSYLLOIDEA: TRIOZIDAE)**

A. G. WHEELER, JR. AND E. RICHARD HOEBEKE

(AGW) Department of Entomology, Clemson University, Clemson, SC 29634, U.S.A.;
(ERH) Department of Entomology, Cornell University, Ithaca, NY 14853, U.S.A.

Abstract.—Collection of the psyllid *Trioza chenopodii* Reuter (Triozidae) at Charlottetown, Prince Edward Island, Canada, in July 1995, represents the first record of this common Palearctic species in North America. Adults were collected on *Atriplex littoralis* L. (Chenopodiaceae). A summary of this psyllid's Old World distribution, the biological literature, and a taxonomic diagnosis and description are provided.

Key Words: Homoptera, Psylloidea, *Trioza chenopodii*, Triozidae, detection, adventive insects, Chenopodiaceae, *Atriplex*

Our work on adventive insects in eastern North America has emphasized their detection in areas especially vulnerable to invasion and establishment by Old World species, documentation of their spread, and observations on their seasonality and habits. Since 1993, we have collected in the Maritime Provinces of Canada, which historically have provided numerous records of immigrant insects (e.g., Brown 1940, Morris 1983, Hoebeke and Wheeler 1996). Nova Scotia, in particular, continues to yield species new to the Nearctic Region (see Hoebeke and Wheeler 1996). Herein we report the first North American collection of the psyllid *Trioza chenopodii* Reuter (Triozidae); summarize the Old World literature on its distribution, life history, and habits; and provide a diagnosis and description to facilitate its recognition among other psyllids in the Nearctic fauna.

TAXONOMIC HISTORY

Trioza chenopodii is a polymorphic species that occurs in both a longwinged summer form (*aestivalis*) and a shortwinged autumn and winter form (*autumnalis*). These

forms, long considered separate species, were established through laboratory rearing to represent dimorphic forms of a single species (Lauterer 1982). Originally described in *Trioza* Förster (Reuter 1876), *chenopodii* was placed in the subgenus *Heterotrioza* (Dobreanu and Manolache 1962), which was raised to generic level by Klimaszewski (1968). In that taxonomic scheme, *chenopodii* belongs to the nominate subgenus *Heterotrioza* (Klimaszewski 1973). Here, however, we follow Hodkinson and White (1979) and Ossiannilsson (1992) in retaining this species in *Trioza*.

DIAGNOSIS AND DESCRIPTION

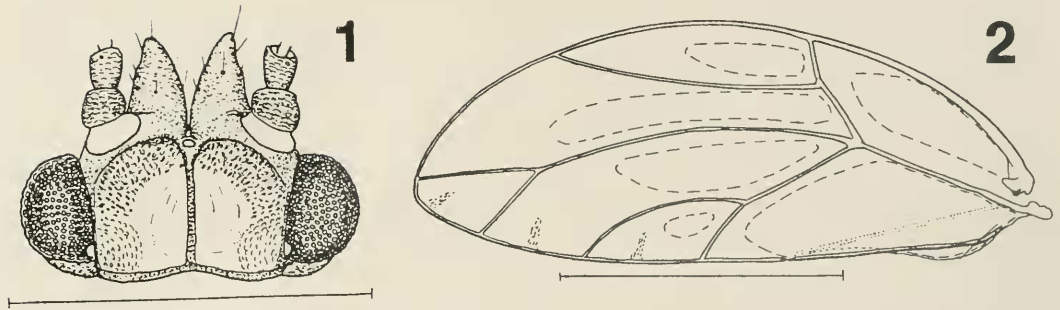
Trioza chenopodii Reuter
(synonymy: after Lauterer, 1982:148;
Ossiannilsson, 1992:324)

Trioza chenopodii Reuter, 1876:76 (= form *autumnalis*).

Trioza obliqua Thomson, 1877:825 (= form *aestivalis*).

Trioza dalei Scott, 1877:31 (= f. *autumnalis*).

Trioza atriplicis Lichtenstein, 1879:cxv (= f. *aestivalis* and ? partly f. *autumnalis*).



Figs. 1–2. *Trioza chenopodii*, male (f. *aestivalis*). 1, Head, frontal aspect. 2, Forewing. Scale line for Fig. 1 = 0.5 mm and for Fig. 2 = 1.0 mm. (From Ossiannilsson, 1992: 323).

Trioza galii; Jacobsen, 1919:359, nec Förster, 1848:87 (form indeterminate).

Trioza horvathi; Jacobsen, 1919:360, nec Löw, 1881:263 (= f. *aestivalis*).

Trioza (Heterotrioza) chenopodii; Klimaszewski, 1973:241.

Heterotrioza chenopodii; Lauterer, 1982: 148.

Trioza, a diverse and ubiquitous genus of worldwide distribution (Hollis 1984), includes 45 Nearctic species (Hodkinson 1988). *Trioza chenopodii* can be readily distinguished from all other Nearctic psyllids by its preference for the Chenopodiaceae (only two Nearctic species of *Craspedolepta* are known to feed on chenopods; Hodkinson, 1988:1227) and by its highly characteristic male genitalia (Figs. 3–5). This newly detected chenopod specialist can be recognized as a member of the genus *Trioza* (Triozidae) by the following combination of characters: antenna cylindrical, without long, dark setae; head in dorsal view with vertex short, at most 0.8 times as long as broad, and generally much shorter; genae with conspicuous processes (genal cones) (Fig. 1); forewing with veins Cu1 and M not having a common stem, each arising separately from common origin at vein R (Fig. 2); and forewing without brown color pattern, occasionally uniformly yellow. The following description is taken from Hodkinson and White (1979:75) and Ossiannilsson (1992:324).

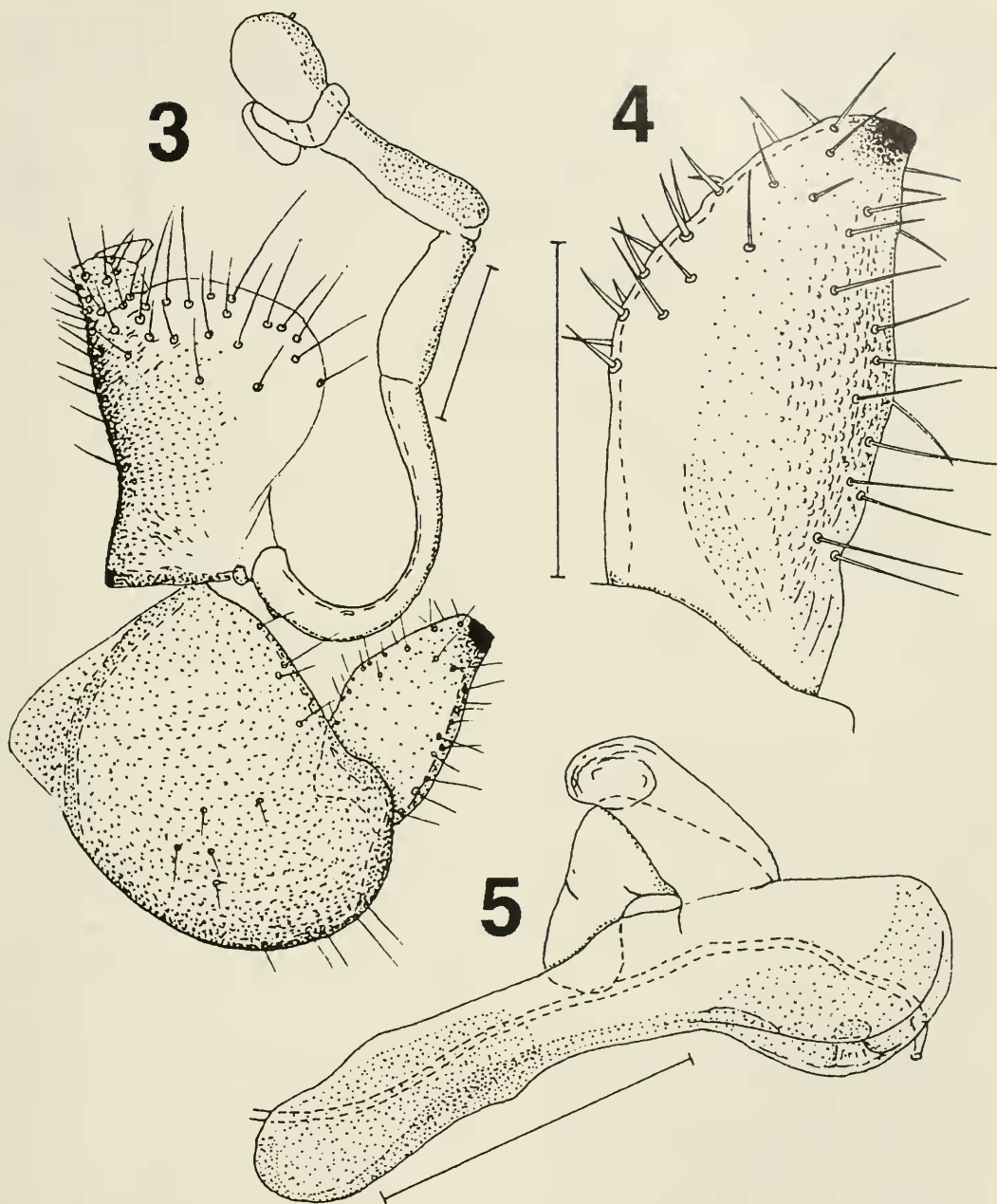
Adult.—Extremely variable in color;

young specimens generally yellow or yellow-green with brown markings, abdomen often green; in older specimens dorsum often uniformly dark brown. Antenna varying in pigmentation, but generally segments II–V pale, remaining segments brown or black. Seasonally dimorphic: autumn–winter form (*autumnalis*) with short forewings and summer form (*aestivalis*) with forewings normal in length. Metatibia with 3 (arranged 2 + 1) thick, black apical spines. Forewing with surface spinules largely confined to basal half of wing. Shape and surface structure of head as in Fig. 1. Male genitalia (Figs. 3–5): proctiger in lateral aspect with well-developed posterior lobe (Fig. 3); paramere in lateral aspect tapering to acute apex (Fig. 4); apical portion of aedeagus with highly characteristic subapical process (Fig. 5). Female terminalia (Figs. 6–7): proctiger in lateral and dorsal aspects long (Figs. 6–7); circum-anal ring as in Fig. 7. Overall length of male (European literature) 2.10–2.71 mm (form *aestivalis*), of female (European literature) 2.48–3.05 mm (form *aestivalis*). Principal hosts: *Chenopodium*, *Atriplex*, and *Halimione* (European literature).

For a description of the fifth-instar nymph of both forms (*aestivalis* and *autumnalis*), the reader is referred to Ossiannilsson (1992:324–325).

GEOGRAPHIC DISTRIBUTION

Trioza chenopodii is widespread in the Palearctic Region, occurring in Great Brit-

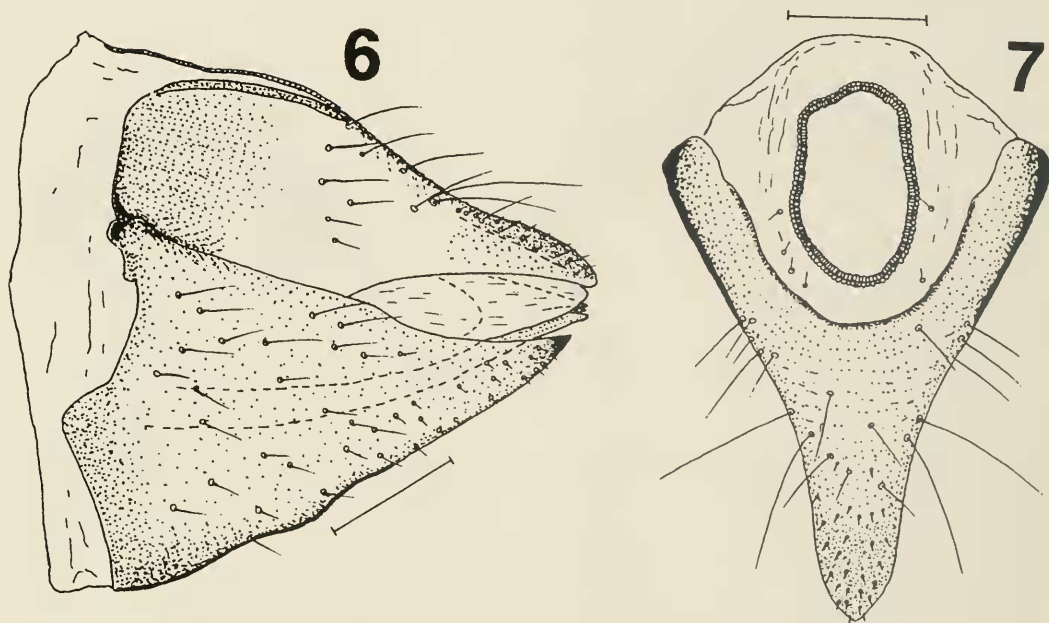


Figs. 3–5. *Trioza chenopodii*, male (f. *aestivalis*). 3, Terminalia, lateral aspect. 4, Left paramere, lateral aspect. 5, Apical portion of aedeagus (showing subapical process), lateral aspect. Scale lines = 0.1 mm. (From Ossianilsson, 1992: 324).

ain, most of continental Europe, Canary Islands, Cyprus, the Caucasus and other portions of the former USSR, North India, Pakistan, Iran, Israel, and Egypt (Klimasz-

ewski 1973, Lauterer 1982, Burckhardt 1986, Hodkinson and White 1979, Ossianilsson 1992).

On July 26, 1995, adults of the long-



Figs. 6-7. *Trioza chenopodii*, female (f. *autumnalis*). 6, Terminalia, lateral aspect. 7, Proctiger (and circum-anal ring), dorsal aspect. Scale lines = 0.1 mm. (From Ossiannilsson, 1992: 325).

winged form (*aestivalis*) were found on *Atriplex littoralis* L. (= *A. patula* var. *littoralis* (L.) Gray) growing along the shore at Charlottetown, Prince Edward Island. The 36 adults collected are deposited in the Cornell University Insect Collection, Ithaca, NY (21 ♀, 9 ♂), and the National Museum of Natural History, Beltsville, MD (3 ♀, 3 ♂).

BIONOMICS

This psyllid is common in ruderal habitats, often between 160 and 300 meters above sea level, where it develops on various *Chenopodiaceae*. Species of *Chenopodium* and *Atriplex* are the principal hosts (Lauterer 1982, Burckhardt 1986), although it occurs on other chenopods, including *Halimione portulacoides* (L.) Aell. (Hodkinson and White 1979). In the laboratory it has been reared on sugar beet (*Beta vulgaris* L.) and spinach (*Spinacea oleracea* L.), although considerable mortality occurred on the latter plant. Early-instar nymphs are gall formers, feeding within leaf folds on their hosts, but fourth and fifth

instars are free feeders on leaves, stems, petioles, and inflorescences (Lauterer 1982). *Trioza chenopodii* is multivoltine over much of its range but apparently produces only two generations in Great Britain and Scandinavia (Hodkinson and White 1979, Lauterer 1982, Ossiannilsson 1992). However, in the plains and foothills of northern Punjab (Rawalpindi area), Pakistan, at least five generations occur on *Chenopodium* spp. between January and October. There, *T. chenopodii* is one of three insects and a fungus that showed great potential as biological control agents of weedy *Chenopodium* in cultivated cereal and vegetable fields (Baloch and Ghaffar 1984).

In the former Czechoslovakia, adults of the shortwinged form overwinter in leaf litter and grasses near the host plants and move onto chenopods in late April or early May. Eggs are laid singly, usually on upper or lower leaf surfaces. Adults of the first summer generation appear from late May to early June. Adults of the first and second summer generations overlap during August. The season's final generation, comprised of

shortwinged adults induced by decreasing daylength, may not appear until early November. Thus, Czechoslovakian populations typically consist of two (rarely three) summer (*aestivalis*) generations and one *autumnalis* generation (Lauterer 1982). For additional biological information, including the effects of photoperiod on diapause, the reader is referred to Lauterer's study.

Atriplex littoralis, on which *T. chenopodii* was collected in Prince Edward Island, is also recorded as a host of this psyllid in Europe (Hodkinson and White 1979, Lauterer 1982). This Holarctic chenopod, widespread in North Temperate regions, is regarded as an obligate halophyte (Taschereau 1985). In northeastern North America, diploid coastal populations of *A. littoralis* are thought to be mainly introduced, whereas hexaploid plants occurring in inland saline habitats (and occasionally along the coast) are probably native (Gleason and Cronquist 1991).

MODE OF INTRODUCTION

We consider *T. chenopodii* to have been introduced accidentally into North America, perhaps with ship's ballast, nursery stock, or packing material used in shipping plants. More than 20 other psyllids are believed to be adventive in North America (Downer *et al.* 1988; Hodkinson 1988; Gill 1987, 1991; Pozzi 1988). *Trioza chenopodii*, which appears to be overlooked frequently in Europe (Ossiannilsson 1992), might be more widespread in coastal populations of *A. littoralis* in northeastern North America.

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